

A new species of *Isometrus* Ehrenberg 1828 (Scorpiones: Buthidae) from Laos

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Abstract — A new species, *Isometrus* (*Reddyanus*) *lao* sp. n., is described from the northern region of Luang-Prabang, Laos. Differences in coloration and morphometric values of the *Isometrus* species described from Southeast Asia attest to a micro-endemic distribution pattern. Comments on the other *Isometrus* species of Southeast Asia are proposed and comparative illustrations and morphometric values are also added.

Key words — Scorpion, Buthidae, new species, *Isometrus*, Laos, rainforest

Introduction

As already exposed in previous publications (Lourenço & Duhem 2010; Lourenço 2011a), the scorpion fauna of Southeast Asia can still be considered as poorly studied. Pioneer work was conducted by Fage (1933, 1936, 1946), who described interesting new elements of this fauna (Fage 1933, 1946). Subsequently, some other contributions such as the monographic work of Couzijn (1981) on the genus *Heterometrus* Ehrenberg 1828, and the revisions of the genera *Chaerilus* Simon 1877 and *Isometrus* Ehrenberg 1828 by Kovařík (2000, 2003) revealed additional new species. Kovařík (2003) described several new species, including one species, *Isometrus* (*Reddyanus*) *petrzekai*, from Vietnam. Shortly after, two other species, *Isometrus* (*Reddyanus*) *hainanensis* Lourenço, Qi & Zhu 2005 and *Isometrus* (*Reddyanus*) *deharvengi* Lourenço & Duhem 2010 were described from the Island of Hainan and Vietnam. In fact, most of the specimens previously collected by C. Dawydoff in Indochina were formerly misidentified by Fage (1933, 1936, 1946) as *Isometrus vittatus* Pocock 1900. This last species is in fact distributed in India. Unfortunately, Kovařík's descriptions of the new species of *Chaerilus* and *Isometrus* were rather insufficient and poorly illustrated. The study of further specimens from the collections of the Muséum national d'Histoire naturelle, Paris, allowed more precise diagnoses and proper illustrations of both *Chaerilus petrzekai* Kovařík 2000 and *Isometrus* (*Reddyanus*) *petrzekai* Kovařík 2003, both from Vietnam (Lourenço et al. 2005; Lourenço & Zhu 2008a; Lourenço & Duhem 2010). Subsequent studies also led to the description of new species of *Chaerilus* and *Isometrus* from Laos and Vietnam (Lourenço & Zhu 2008a, b; Lourenço & Duhem 2010; Lourenço 2011a, b).

Naturally, the most remarkable discoveries and

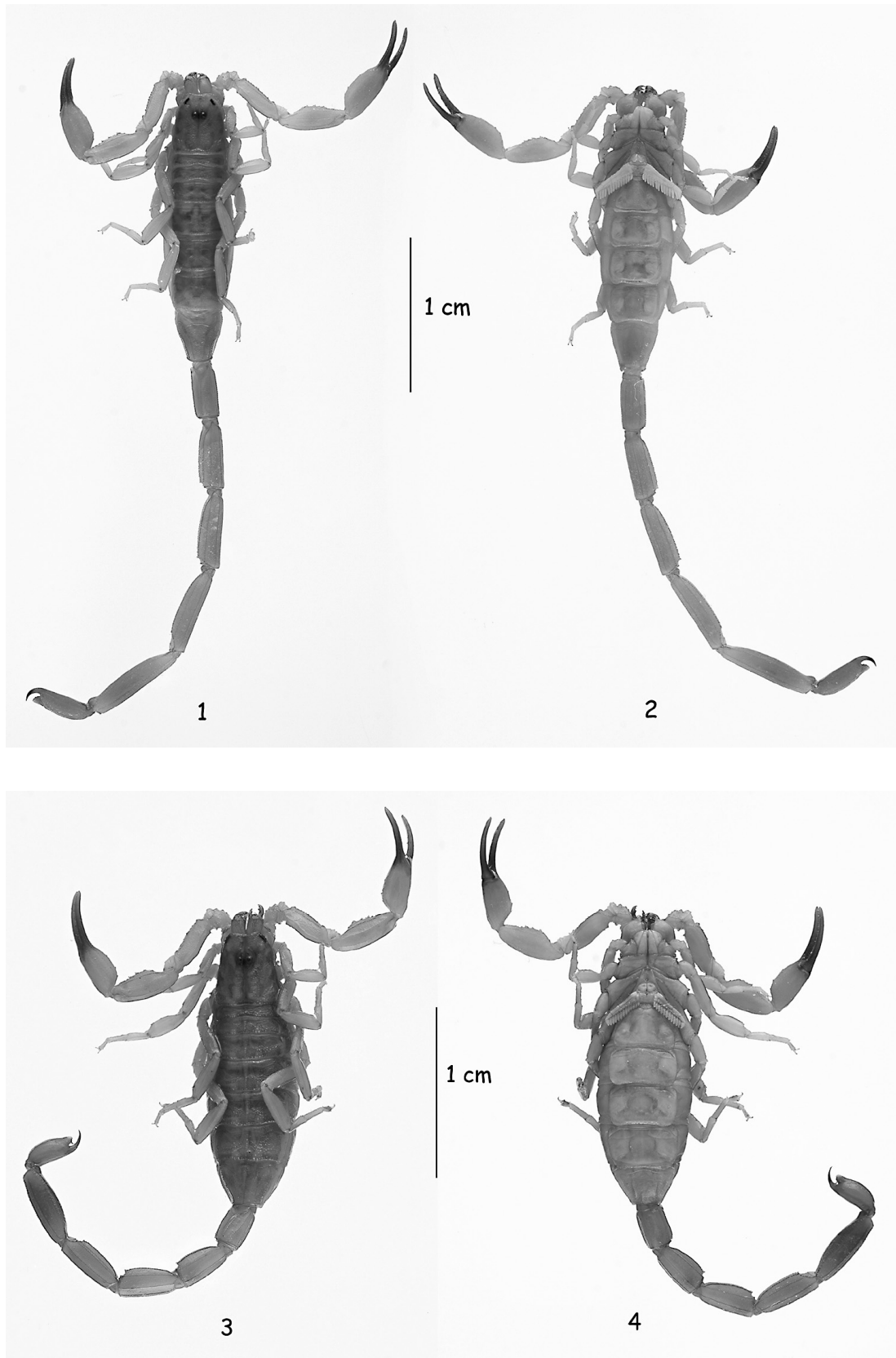
descriptions in recent years were of the taxa of the enigmatic family Pseudochactidae Gromov 1998, previously known only from Tajikistan and Uzbekistan (Lourenço 2007). Two new genera *Troglokhammouanus* Lourenço, 2007 and *Vietbocap* Lourenço & Pham 2010 and four new species, *Troglokhammouanus steineri* Lourenço 2007, *Vietbocap canhi* Lourenço & Pham 2010, *V. thienduongensis* Lourenço & Pham 2012 and *V. lao* Lourenço 2012 were recorded from caves in Laos and Vietnam (Lourenço 2007, 2012; Lourenço & Pham 2010, 2012). The biogeographical impact of these discoveries in Southeast Asia will be the subject of a future contribution (Lourenço, in preparation).

Differences in the coloration and morphometric values of the *Isometrus* species already described from Southeast Asia attest to a micro-endemic distribution pattern also observed for the species of the genus *Chaerilus* (Lourenço 2011a, b).

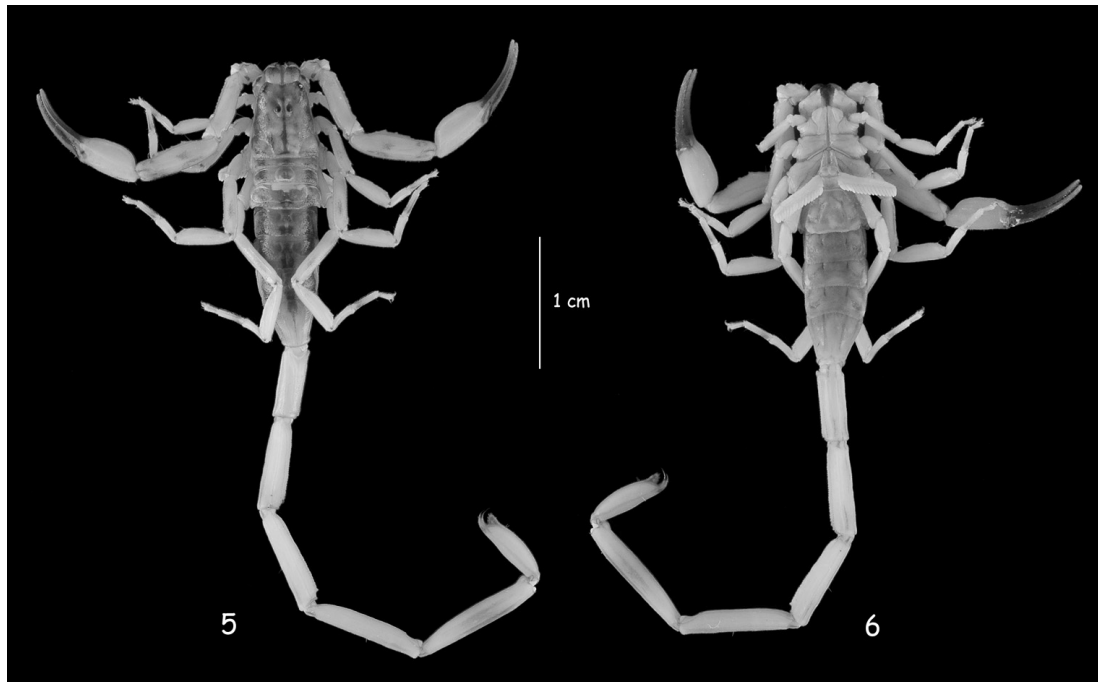
Materials and methods

The specimens used in the present study have been collected during the expeditions of the French zoologist of Russian origin, Prof. Constantine Dawydoff, who in 1929–1934 and 1938–1939 conducted fundamental zoological research in Indochina in the Institute of Oceanography at Cau Da (Cauda) near Nha-Trang (now Vietnam). The specimens collected by C. Dawydoff were misidentified by Fage (1933, 1936, 1946) as *I. vittatus*.

Illustrations and measurements were produced using a Wild M5 stereomicroscope with a drawing tube (camera lucida) and an ocular micrometer. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations are those of Vachon (1974) and morphological terminology mostly follows Hjelle (1990).



Figs. 1–4. *Isometrus (Reddyanus) lao* sp. n., male holotype (1–2) and female paratype (3–4), dorsal and ventral aspects.



Figs. 5–6. *Isometrus (Reddyanus) deharvengi*, male holotype, dorsal and ventral aspects.

Taxonomic treatment

Family Buthidae C. L. Koch 1837

Genus *Isometrus* Ehrenberg 1828

As previously discussed by Lourenço et al. (2005), Lourenço & Zhu (2008b), and Lourenço & Duhem (2010), the genus *Isometrus* was described by Ehrenberg (in Hemprich & Ehrenberg,) (1828) with *Buthus (Isometrus) filum* Ehrenberg 1828 [= *Isometrus maculatus* (DeGeer 1778)], as type species by monotypy. Vachon (1972) proposed the division of the genus *Isometrus* into two subgenera: *Isometrus* Ehrenberg and *Reddyanus* Vachon. The diagnoses of the two subgenera were only proposed in a short key and based on the relative positions of certain trichobothria. *Isometrus* has trichobothrium *db* of the fixed finger in a distal position in relation to the trichobothria *et* and *est*; the distance between external trichobothria of the femur, *e*₁ and *e*₂, being two to five times the distance between trichobothria *e*₁ and *d*₃ of the femur. In contrast, *Reddyanus* has trichobothrium *db* in a basal position to *et*, situated between *et* and *est*; the distance between external trichobothria of the femur, *e*₁ and *e*₂ is always less than twice the distance between *e*₁ and *d*₃.

Vachon (1972) placed three species in the subgenus *Isometrus* and five in the subgenus *Reddyanus*, leaving five others without a precise assignment. In the *Catalog of the Scorpions of the World*, Fet & Lowe (2000) placed six species in the subgenus *Isometrus* and 16 species in the subgenus *Reddyanus*. Kovařík (2003) placed four species in the subgenus *Isometrus* and 21 species in the subgenus *Reddyanus*. It would therefore seem that the subgenus

Reddyanus is much more speciose than the subgenus *Isometrus*.

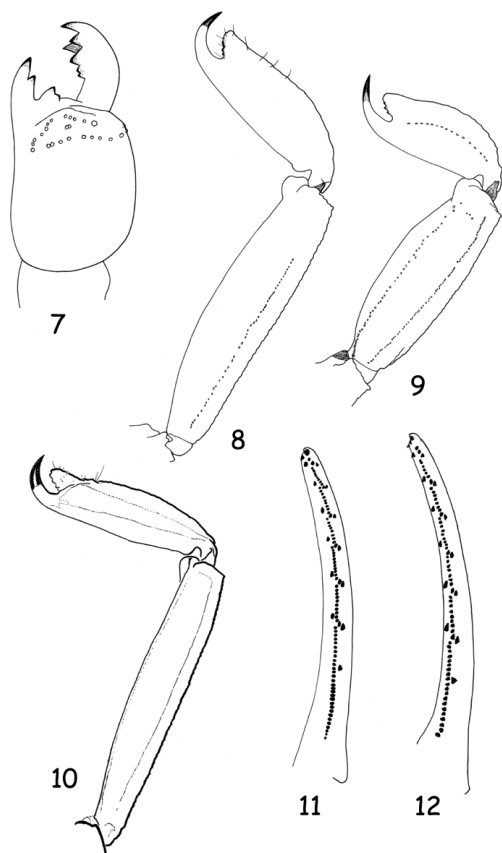
***Isometrus (Reddyanus) lao* sp. n.**
(Figs. 1–4, 7–9, 11, 13–18)

Type material. Male holotype and female paratype. Laos, North of Luang-Prabang, V/1938 (C. Dawydoff leg.). Deposited in the collections of the Museum national d'Histoire naturelle, Paris (MNHN).

Etymology. The specific name refers to the native inhabitants of Laos.

Diagnosis. *Isometrus* species of moderate to small size, measuring 45 mm in adult male and 37 mm in adult female. General coloration yellow to pale yellow in both sexes; a few dark spots present, better marked in female. Carinae and granulations moderately to weakly marked. Carapace moderately to weakly emarginate, without any shaped angle. Pectines moderately long; pectinal tooth count 14–14 in male and 12–13 in female. Pedipalp chela fingers short; dentate margins of fixed and movable fingers with 6–6 almost linear rows of granules. Internal face of pedipalp patella with 5/6 strong spinoid granules. Telson moderately to weakly elongated, slightly globular; subaculear tubercle strongly developed and rhomboid, with 5–6 ventral granules.

Remarks. From its small size, general morphology and pale coloration pattern, *Isometrus (Reddyanus) lao* sp. n. appears to be most closely related to *I. (R.) hainanensis*, described from the Island of Hainan. The Island of Hainan is located not too far from the north coast of Vietnam and in a similar latitude to the type locality of the new species in

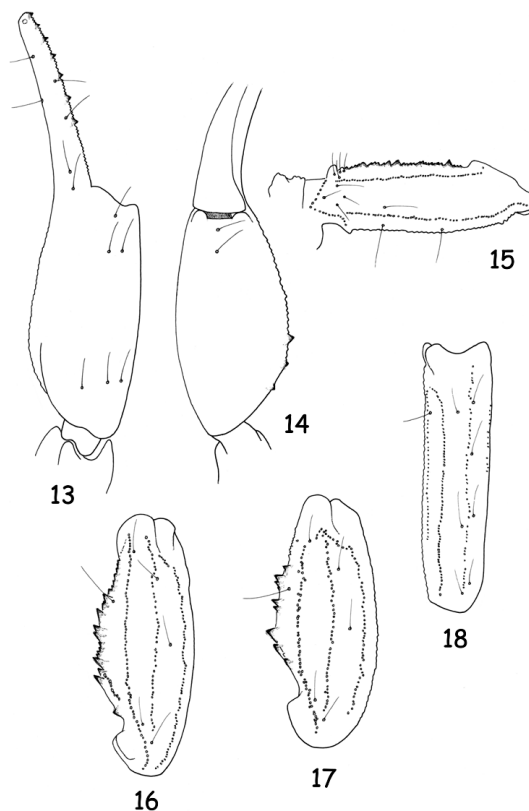


Figs. 7–9, 11. *Isometrus (Reddyanus) lao* sp. n., male holotype (7–8) and female paratype (9, 11); **10.** *I. deharvengi* (male holotype); **12.** *I. vittatus* (female holotype). 7. Chelicera, dorsal aspect; 8–10. Metasomal segment V and telson, lateral aspect; 11–12. Cutting edge of chela movable finger.

Laos. It can, however, be distinguished from this last species a number of features: (i) a slightly darker coloration pattern, (ii) smaller size and marked distinct morphometric values (see Table 1), (iii) pedipalp chela fingers shorter with only 6–6 rows of granules, (iv) telson less elongated and slightly globular, (v) pectines smaller with less teeth.

This new species also resembles *I. (R.) deharvengi* and *I. vittatus*, but is separated from them by the following points. Male of this new species is smaller than that of *I. (R.) deharvengi* (see Table 1), and has metasomal segments and telson slightly thicker than the latter (cf. Figs. 1–2, 8 & Figs. 5–6, 10). Females of this new species and *I. vittatus* are slightly different from each other in the pattern of rows of granules in chela movable fingers; 6 rows of granules in the new species vs. 7 rows for *I. vittatus* (cf. Fig. 11 & Fig. 12).

Description. Coloration. Generally yellow to pale yellow. Prosoma: Carapace yellowish with some reddish-brown spots laterally one median strip running from the median eyes to the posterior margin; spots better marked in female; eyes surrounded by black pigment. Mesosoma: Tergites yellow with three longitudinal reddish-brown stripes that continue the median and lateral stripes of the carapace; these are vestigial in male. Metasomal segments



Figs. 13–18. *Isometrus (Reddyanus) lao* sp. n., male holotype (13–16, 18) and female paratype (17), trichobothrial pattern. 13–14. Chela, dorso-external and ventral aspects; 15. Femur, dorsal aspect; 16–18. Patella, dorsal and external aspects.

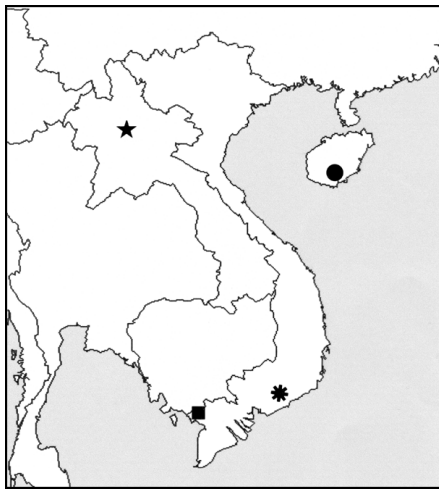
yellow, with some minute, diffuse, brownish spots on segment V. Vesicle yellow; aculeus yellowish at base and reddish at tip. Venter pale yellow all over. Chelicerae yellow with reddish-brown variegated spots, better marked on female; fingers yellow, slightly infuscate, teeth reddish. Pedipalps yellowish, without infuscations; chela fingers reddish-brown; rows of granules on dentate margins of fingers dark reddish. Legs yellow to pale yellow without spots.

Morphology (morphometric measurements in Table 1). Prosoma: Anterior margin of carapace moderately to weakly emarginate, without an open angle. Carapace carinae weakly marked; anterior median and posterior median carinae weakly developed; central lateral carinae inconspicuous. Intercarinal spaces weakly to moderately granular. Median ocular tubercle anterior to the centre of the carapace; median eyes separated by approximately one ocular diameter. Three pairs of lateral eyes. Mesosoma: Tergites I–VI with a median carina, better marked in female; weak on I, weak to moderate on II–VI. Tergite VII pentacarinat, with lateral pairs of carinae moderate to strong; median carinae present in proximal half, moderately developed. Intercarinal spaces moderately to weakly granular. Sternites III to VI smooth; VII with a weakly marked granulation; spiracles moderately long; sternite VII with four carinae. Pectines moderately long; pectinal teeth count

Table 1. Morphometric values (in mm) of male holotype and female paratype of *Isometrus* (*Reddyanus*) *lao* sp. n., male holotype and female paratype of *Isometrus* (*Reddyanus*) *hainanensis* and male holotype of *Isometrus* (*Reddyanus*) *deharvengi*.

	<i>Isometrus</i> (<i>R.</i>) <i>lao</i> sp. n.		<i>I.</i> (<i>R.</i>) <i>hainanensis</i>		<i>I.</i> (<i>R.</i>) <i>deharvengi</i>
	Holotype	Paratype	Holotype	Paratype	Holotype
Total length	40.7	37.7	53.4*	34.2*	60.7*
Carapace:					
— length	4.0	4.2	4.9	4.6	6.1
— anterior width	2.4	2.5	2.9	2.8	3.4
— posterior width	3.6	4.2	4.6	4.6	5.4
Metasomal segment I:					
— length	3.4	2.4	4.7	3.1	6.0
— width	1.7	1.9	1.8	2.0	2.1
Metasomal segment V:					
— length	6.4	4.8	8.5	5.4	9.8
— width	1.4	1.3	1.3	1.4	1.7
— depth	1.5	1.5	1.5	1.6	1.8
Telson length	4.3	3.5			6.4
— width	1.4	1.2	1.4	1.2	1.7
— depth	1.4	1.3	1.5	1.4	1.7
Pedipalp:					
— Femur length	3.8	3.4	4.9	4.0	5.8
— Femur width	1.2	1.3	1.5	1.3	1.7
— Patella length	4.4	4.1	5.5	4.7	6.6
— Patella width	1.5	1.7	2.0	1.9	2.2
— Chela length	7.1	6.6	8.4	7.4	10.7
— Chela width	1.8	1.7	2.1	1.8	2.4
— Chela depth	1.6	1.5	1.8	1.4	2.0
Movable finger:					
— length	3.6	3.9	4.5	4.3	6.0

* The total length does not include the telson.

**Fig. 19.** Map of Southeast Asia, showing the distribution of the *Isometrus* species known from this region: *Isometrus* (*R.*) *petrzeltkai* (asterisk); *Isometrus* (*R.*) *hainanensis* (circle); *Isometrus* (*R.*) *deharvengi* (square); *Isometrus* (*R.*) *lao* sp. n. (star).

14–14 in male holotype, 12–13 in female paratype. Metasomal segment I with 10 carinae, crenulate; II to IV with 8 carinae, crenulate. Segment V with five carinae; one posterior spinoid granule on dorsal carinae of segments II–III on male and II to IV on female. Dorsal furrows of all segments weakly developed, smooth; intercarinal spaces very weakly granular to smooth. Telson moderately to

weakly elongated and slightly globular; weakly granulated on female and almost smooth on male; one vestigial ventral carina on both sexes; subaculear tubercle very strongly marked and rhomboid, with 5–6 granules on the ventral surface. Chelicerae with dentition characteristic of buthids (Vachon 1963); two very reduced basal teeth on movable finger. Pedipalps: Femur pentacarinat; all carinae crenulate. Patella with seven carinae, crenulate; dorsointernal carinae with 5–6 spinoid granules. Chela with 6–7 weakly crenulated carinae; internal face with 4–5 spinoid granules. Intercarinal spaces moderately to weakly granular. Dentate margins on fixed and movable fingers composed of 6–6 almost linear rows of granules. Trichobothrial pattern type A, orthobothriotaxic (Vachon 1974); dorsal trichobothria of femur in β (beta) configuration (Vachon 1975). Legs: ventral aspect of tarsi with a brush-like group of setae. Tibial spurs absent; pedal spurs present and moderately developed on all legs.

Distribution. Only known from the type locality. The known distribution of the *Isometrus* species in Southeast Asia is illustrated in figure 19.

Specimens examined for comparison. *Isometrus* (*Reddyanus*) *deharvengi*, male holotype, Vietnam, Kien Giang, Kien Luong: Hon Chong, Nui Hon Chong hill: Hang Giêng Tiên, in cave, 8/XI/1993 (L. Deharveng) (MNH-VIET-010); *Isometrus vittatus*, female holotype, India, Madras, no date, (J. R. Henderson) BMNH (Natural History Museum, London).

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